RECORD OF ORAL HEARING

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOSEPH A. FERNANDO, JOHN D. TEN EYCK, and THOMAS S. LACKI

Appeal 2012-001554
Application 09/560,469
Group Art Unit 1700

Oral Hearing Held: November 8, 2012

Before RICHARD E. SCHAFER, PETER F. KRATZ, and BEVERLY A. FRANKLIN, *Administrative Patent Judges.*

APPEARANCES:

ON BEHALF OF THE APPELLANT:

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The above-entitled matter came on for hearing on Thursday, November 8, 2012, commencing at 2:26 p.m., at the U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia, before Judy Harrell Wallenfelt, Notary Public.

PROCEEDINGS

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USHER: Calendar No. 65, 2010-001554, Mr. Sidoti.

JUDGE SCHAFER: Okay. Before we go on the record --

(Discussion off the record.)

JUDGE SCHAFER: Okay. Let's go on the record. This is Appeal No --

MR. SIDOTI: 2012.

JUDGE SCHAFER: -- 2012-001554, and it's in regard to Serial No. 09/560,469.

Mr. Sidoti, we're familiar with your materials, so if you'll go ahead and give us your argument.

MR. SIDOTI: Thank you. Good afternoon, your Honors. Sal Sidoti, and I am attorney with Curatolo Sidoti in lovely Cleveland, Ohio; and I'm here today representing the application of the Unifrax Corporation. I'd like to thank the Board for giving me the opportunity this afternoon to appear and give my arguments in this case.

This application is directed to mounting mats for exhaust gas treatment devices, and exhaust gas treatment devices that include this mounting mat.

By way of background, there are two different -- there are two

major types of exhaust gas treatment devices; catalytic converters and diesel particulate traps.

They're both very similar devices. Both have an outer metallic housing. Both have a fragile ceramic monolith that resides within this housing. And wrapped around that ceramic monolith is a layer of fibrous material which we refer to as a mounting mat.

The difference between the two devices is a catalytic converter on that fragile monolith, there is catalyst that's deposited on there that catalyzes reactions from the gases coming out of the engine of the vehicle.

The diesel particulate trap has a filter in there that filters out the particulate byproduct from the combustion of the diesel fuel in diesel vehicles.

But both have this mounting mat, and it's wrapped around the circumference of the ceramic monolith, and then that monolith is forced into the housing.

And that layer of mounting mat resides in that gap between the inner surface of the metallic housing and the outer surface of the ceramic monolith.

So during the normal operation of a vehicle -- and I'll just refer to an internal combustion engine that utilizes a catalytic converter -- the gases flow from the internal combustion

engine out into the catalytic converter, and the gases go through this honeycomb monolith and are catalyzed into -- carbon monoxide that's in that gas is converted to carbon dioxide and water that's then -- it goes out your tail pipe into the environment.

The mounting mats have basically three functions. They serve to hold that ceramic monolith in place during normal operation of the catalytic converter. It provides thermal insulation to the outer metallic housing.

And it provides a gas-tight seal so that gases don't sort of go past the monolith in the gap; they go right through the monolith, and therefore they're catalyzed.

This mounting mat has to have the sufficient holding force or holding pressure to hold the monolith in place during normal operation of the catalytic converter. But the pressure cannot be so great, because this is ceramic and it is somewhat fragile. So you don't want the pressure to be so great that it will crush the monolith.

Turning to the specific claims in the application, we have three independent claims, 112 and 47.

Claim 1 is directed to a mounting mat that has a plurality of melt-formed ceramic fibers. These ceramic fibers are prepared from 40 to 60 weight percent alumina, 40 to 60 weight percent silica. And as these are prepared from these molten materials, they're initially

amorphous fibers, meaning they don't have any crystalline structure that's detectable.

These fibers are subsequently heat-treated under one of two different time-temperature regimens to develop a certain crystallinity in the fiber.

And what we've claimed is a percent crystallinity of 5 to 50 percent; and that of that crystallinity, the crystallite size is about 200 to 500 angstroms, as measured by X-ray defraction.

Claim 12, which is directed to another embodiment of the mounting mat, basically is very similar to Claim 1 except there's a different time-temperature heat treatment regimen claimed.

Instead of 990 to 1050 for greater than one hour which is in Claim 1, this time-temperature regimen in Claim 12 is greater than 1050 Celsius for an effective amount of time of develop the crystallinity and the crystallite size.

Claim 47 is similar to Claim 1, except we don't -- we don't recite in there the time-temperature heat treatment. We just recite what the percent crystallinity and the crystallite size is.

There was a final rejection on May 19, 2010. The primary rejection was Robinson plus Miles. It was a 103.

And then there was another rejection, Robinson plus Miles plus Sasaki; and that was directed to some independent -- or excuse me,

dependent claims directed to shot content of the fibers and needle mats.

We filed our main brief in April of 2011, and we addressed the rejections in the examiner's final rejection. In view of those arguments, the examiner withdrew her previous arguments and issued new final rejections.

And the new final rejections are on page 4 of the examiner's answer; and it's Claims 1, 2, 5, 6, 8 through 13, 16, 17, 19 through 27, 47 through 50, and 52 through 57 are rejected under 103 in view of Robinson/Miles from the old rejection, plus Langer.

And then the dependent claim is directed to the shot content and the needling of the mat are rejected in view of Robinson, Miles, Langer, and Sasaki.

We elected to continue on with the appeal rather than to reopen prosecution, and we filed a reply brief; and I'm here before you today arguing the case.

I think my argument with respect to the first rejection, the combination of Robinson, Miles, and Langer, is very straightforward and very simple.

I think that the examiner is using the Langer reference to show that melt-formed fibers are used in mounting mats for catalytic converters, and then pulling in Miles to show melt-formed ceramic fibers with crystallinity greater than Langer.

But my argument here is that Langer specifically teaches away from using the types of fibers in Miles.

So to start with Robinson, which is the primary reference, I think we all agree that Robinson definitely shows a catalytic converter having an outer housing, a monolith, and a layer of mounting mat between the monolith and the housing.

But Robinson is specifically limited to the use of sol-gel fibers, which are fibers from a solvent solution of ceramic oxide precursors.

And in column 5 of Robinson, beginning at line 50, Robinson discloses, "Ceramic fibers which are useful in the mounting mat of the present invention include polycrystalline oxide ceramic fibers such as molite, aluminum, PI-alumina, aluminum silicates, zirconia, titania, chromium oxide and the like."

With respect to that first sentence, the examiner makes an allegation in her examiner's answer that this is just illustrative of the type of fibers that could be used, and there's really a broader -- alleged broader disclosure of all types of inorganic fibers that can be used.

But I think it's really clear that first part of the sentence, the fibers which are useful in the mounting mat of the present invention include these. It doesn't say these, for example. It's all polycrystalline oxide ceramic fibers, and this list is all those type of fibers that are made by sol-gel or solution spinning process.

Later on in that paragraph, two patents are cited for the proposition that the sol-gel fibers could be used. And the first one, this 205 patent to Miyahara, which is also owned by my client.

By the way, Robinson is owned by my client. On the face of the patent, it says Unifrax. On the face of the Miyahara patent, it says Carborundum Company.

My client, Unifrax, is the successor in interest to the fibers business of the Carborundum Company, so we're familiar with this patent as well. And it's clear that that is a solution spinning process in Miyahara.

And in column 3, starting at line 1, they talk about "fibers produced in accordance with the invention have excellent refractoriness, flexibility, and believed to comprise a fiber which is either noncrystalline or contains small interconnecting or intertwined crystallites." So this is sol-gel with very small or fine grain crystals.

Turning to the second patent cited in Robinson, the 269 patent, on the face of this it's assigned to Kennecott Corporation. Carborundum was a successor to Kennecott, and we're a successor to Carborundum's fiber business. So we own this one as well and are familiar with it.

Again, this is trying to use a high-viscosity solution to make sol-gel fibers. And there's a disclosure that's very similar to the 205 patent.

In column 2, under the heading "Detailed Description of the Invention," starting at line 65, it recites, "The ceramic fibers manufactured in accordance with the process of the invention are usually alumina, chromium, zirconium, titanium oxide fibers, have a polycrystalline or noncrystalline nature; i.e., are composed of microcrystals or are amorphous."

And if you flip over to column 5, lines 38 through 43, again there's this same disclosure about the fibers being noncrystalline, or small intertwined or interconnected crystals.

So Robinson's teachings are sol-gel fibers, very small crystals, not melt-formed, not larger crystals.

Turning to Langer, Langer definitely discloses a catalytic converter with a monolith, with a housing, with a mounting mat disposed between the housing and the monolith. Langer does disclose melt-formed fibers.

However, these melt-formed fibers that Langer discloses are rather fine grain or substantially amorphous. And Langer goes to great lengths to describe what they mean by fine grain or substantially amorphous, both in the patent itself and in their prosection history.

If you look in Langer, column 2, starting about line 51, it talks about the "melt-formed refractory ceramic fibers of the heat insulating mat can be annealed to develop a fine grain crystalline form as in the

Johnson U.K. patent spec while avoiding higher temperatures that would result in coarse grained structures and consequently unsatisfactory resiliency value."

So what Langer says here is, Hold on, you can make fine grain, but don't go coarse grain; because if you go coarse grain, it's not going to work because it won't have the resiliency value, and it won't be able to hold the monolith in place.

It also talks about substantially amorphous, and they define that. Substantially amorphous is meant that no crystallinity can be detected by X-ray defraction, even though microcrystallinity has been detected in some cases by transmission electron microscopy.

If you look at the Johnson U.K. patent which Langer cites to, they specifically recognize that you can take amorphous aluminum silicate fibers and you can heat-treat them to form a crystalline material.

On page 1 of their patent specification, in column 2, lines 78 through 82, the heat treatment being terminated subsequent to the formation of fine grain product but prior to the onset of excessive grain growth -- and on lines 90, 92, they talk about stopping the heat treatment prior to the onset of excessive grain growth.

If you turn to page 2, column 2, about line 93, "Care must be exercised to limit the heat treatment, especially at temperatures above 1050 C in order to prevent excessive grain growth for the use of

excessive temperature above the devitrification temperature, or the use of sufficient devitrification over an excessive period of time will produce coarse grain structures with poor handling properties."

So when you read Langer in connection with the U.K. Johnson spec, it's talking about melt-formed fibers but that have fine grain crystals, not coarse grain crystals; and if you make coarse grain crystals, it's not going to work as a catalytic converter mounting mat.

Turning to the final reference, Miles; Miles discloses melt-formed aluminum silicate fibers. These fibers are prepared from 40 to 65 weight percent alumina, 35 to 60 weight percent silica. These are heat treated to form microcrystals, and it's terminated before you form macrocrystals.

So with respect to Miles and Langer, I do not think that they're properly combinable; because Langer specifically is limited to fine grain and substantially amorphous, whereas Miles develops a crystallinity that's different and greater than that.

And so I think Langer completely teaches away; and since it teaches away, I do not believe it's combinable with Miles, and therefore the rejection can't stand. We can't substitute the fibers for Miles for Langer in the mat of Robinson.

JUDGE FRANKLIN: I think the examiner was using Langer just for the proposition that it's known in the art to use melt-formed

ceramic fibers to form support elements in catalytic converters. So I think that's what the examiner was using Langer for.

So let's talk more about Miles and whether there would be a reasonable likelihood of success of using that type of arrangement in Miles and Robinson. It appeared --

JUDGE SCHAFER: Because even -- I'm sorry. I interrupted you, Judge Franklin. Could you go ahead and --

JUDGE FRANKLIN: That's okay. So if we can just focus on that aspect of the rejection.

MR. SIDOTI: Okay. Do you want to fire away at me, or do you want me just to tell you what I think?

JUDGE FRANKLIN: Tell me what you think.

MR. SIDOTI: Okay. Well, Miles is definitely melt-formed refractory ceramic fiber made from alumina and silica. It's definitely heat treated.

JUDGE FRANKLIN: And if I'm correct, I believe the record doesn't dispute that Miles is using the same process and achieves the same type of fiber?

MR. SIDOTI: I believe -- I believe Miles discloses similar time-temperature regimens to develop crystallinity in their fibers. The one thing that Miles does not teach whatsoever is that you can take these fibers and incorporate them into a mounting mat, and then that mounting

mat would have certain holding pressure or holding force properties when used in a catalytic converter.

Miles specifically talks about furnace insulation, and I'm referring to the type of insulation that you sort of hang blankets of insulation around a furnace, or you position a blanket of this material adjacent a wall of a furnace.

However, in that particular application, there's really no need to worry about holding forces. So you don't have to worry about sort of the bulk densities that are required when you create this mat and you load it into this canister between the outer housing and the monolith.

So there's no -- nothing in Miles that addresses or even contemplates catalytic converters, mounting mats for catalytic converters, or the need for having a holding force or a certain holding pressure in a catalytic converter application.

And so that's why I think with respect to that -- I mean, I wasn't prepared to talk about that rejection. But I sort of think that's sort of a hindsight reconstruction.

We have a patent, a primary reference that has three elements; the housing, the monolith, the mat. But we're missing -- we're missing the heat-treated fibers that developed a certain crystallinity.

So then we're going to go out and look for that particular -- fibers with that crystallinity, and then automatically say that they can be

incorporated into that mounting mat.

So I think that it's a hindsight reconstruction argument. I just don't think that there's anything in Miles that would point anyone having ordinary skill in the art to take those fibers and put them in a mounting mat.

JUDGE SCHAFER: But you don't contest that Miles teaches the same type of fibers that you're claiming?

MR. SIDOTI: I don't contend -- no.

JUDGE SCHAFER: You don't contest that. It's really whether you would take those fibers and put them into the catalytic converter --

MR. SIDOTI: That's correct, your Honor.

JUDGE SCHAFER: -- required by your claim.

JUDGE KRATZ: And this is the rejection -- absent Langer, this is the rejection dropped by the examiner, if I'm not mistaken.

MR. SIDOTI: It was.

JUDGE KRATZ: That's the rejection that, when you -- if you don't have Langer present, the examiner -- not that that's -- but he kind of walked away from that when he says, "I need to get this other reference in here, because I've got to have a way of getting this material into the first reference, Robinson."

MR. SIDOTI: Right. The final rejection in May of 2010 was Robinson and Miles. Our arguments in the appeal brief apparently

overcame that. That was withdrawn. And then the examiner added Langer as a third reference in his combination.

JUDGE KRATZ: And that pretty much is being used as the cement as to why you would make a modification of Robinson, because Langer is supposedly the one that would suggest you could go crystallinity versus amorphous. But the problem you're saying is, because it very specifically says, don't go beyond this microcrystallinity which would not be what you have.

MR. SIDOTI: Yeah. Yeah. That's correct. I believe Langer is explicit. They say fine grain or substantially amorphous.

The interesting corollary about Langer, I looked at the prosecution history a couple times. And I know we're talking about this overall disclosure, but their claims are limited to substantially amorphous.

And so they went -- they went and argued a lot with the examiner about what substantially amorphous is and what fine grain crystalline is. And it's definitely -- what they mean by fine grain crystalline is what's in that Johnson patent. And that Johnson patent is fine grain, not the coarse grain that we're talking about in our arrangement claims.

JUDGE KRATZ: But now having said that, though, is Langer really limited to that? Because the sections you're referring to in Langer

aren't a detailed description of the invention.

And I don't -- is Langer throughout always saying that's the only kind of crystallinity we can use, or he's just talking about --

You're saying that throughout the patent, if you read for its entirety, he is going to always be telling you don't go beyond -- that section at column 2, I think it was -- he's going to tell you, Hey, if you go beyond this, you're not going to get this requirement that you have to have for the holding power or the pressure.

MR. SIDOTI: Mm-hmm. Okay. So let me think on my feet here.

JUDGE KRATZ: I guess what I'm --

MR. SIDOTI: The answer to the question is, he is -- to me, I believe he is explicit. He's saying, I'm using fine grain or I'm using substantially amorphous.

And I think he starts with the proposition that these fibers are amorphous, they're not working, we're doing something to them to increase this resiliency value; and when you have an increased resiliency value, we're having a better holding force.

But there are some considerations. I think he is not saying go past fine grain crystalline.

And in fact, he makes an argument about don't even go to fine grain crystalline. Stay at substantially amorphous, because you have the

same performance and you're not going to waste money on the energy.

He says somewhere in here -- let me see -- he says, "Restricting the annealing temperature subject to melt-formed fibers remain substantially amorphous, there's a significant energy savings compared to Johnson's need to develop a crystalline structure."

So Johnson develops a fine grain crystalline structure. He's saying we can go with that embodiment; or even better, let's stay with substantially amorphous because you're going to have an energy savings.

And I think he says something else about that energy savings. Column 3, line 3, the effectiveness a heat insulating mat of melt-formed refractory ceramic fibers that are substantially amorphous is surprising in view of the need of Johnson U.K. to convert the fibers to a fine grain crystalline form.

JUDGE KRATZ: And he's also saying in that paragraph 2, is what you pointed to earlier, I think. But at least from your perspective, he's suggesting that no matter what, you don't want to go to that coarse grain, because you're not going to get that resiliency value.

And you're suggesting that prior to your invention, the teaching in the art -- at least represented by these three references -- would be that the kind of material that's in Miles would have been taught by Langer, don't go there. Is that what you're saying.

MR. SIDOTI: I'm saying Miles wouldn't -- I'm saying there's

no teaching in Miles to incorporate that material in a mounting mat.

JUDGE KRATZ: I guess my question, then, to be more specific, is Miles the kind of coarse grain that Langer is talking about you don't want to go to?

MR. SIDOTI: I think there's an overlap, so I have to be -- I mean, we're talking -- we're talking -- might want to make sure I'm not making any misrepresentations about Miles.

If you look in Miles, there is in column 2, it talks about what microcrystalline is; 0.1 microns. So if you do a back-of-the-envelope calculation, all right, 0.1 microns is 1,000 angstroms. So there's an overlap. Right? We're saying Johnson is less than 200 angstroms, we're more than 200 angstroms. Okay? So there's an overlap there.

But my point is still, if Langer is saying you don't go there, and Miles covers maybe an overlap including some fine grain and a lot of coarse grain, you can't combine Miles with Langer because it's saying not to go there.

Because if I read Langer, why would I read Miles and say, Oh, wow, this thing with greater -- larger coarse crystals, let's put that in a mounting mat. And Langer is telling me not to do that.

JUDGE KRATZ: And Miles doesn't say anything about a mounting mat?

MR. SIDOTI: Not at all.

JUDGE KRATZ: So that's the point you're trying to make in total. You're saying Miles is not giving you any information that goes to modify Robinson; you have to have Langer present to get that --

MR. SIDOTI: That's --

JUDGE KRATZ: -- modification.

MR. SIDOTI: -- that's correct. And Langer, if I would read Langer, there's no way I would run to coarse. I would run the opposite. I would run -- in fact, I would run towards substantially amorphous, because he's saying that that's even better because it's a cost savings and an energy savings.

JUDGE KRATZ: I understand your position.

MR. SIDOTI: So I really don't have any other --

JUDGE SCHAFER: Okay. Yeah. Well, that's good, because your time is up.

MR. SIDOTI: I didn't even get to the dependent claim.

JUDGE SCHAFER: That's all right. It's in your brief. We do consider your brief.

MR. SIDOTI: Well, I do appreciate that. I appreciate you having me today.

JUDGE SCHAFER: Okay. Thank you. The case is submitted.

MR. SIDOTI: Thank you, your Honors.

(The hearing was concluded at 2:45 p.m.)